

REMARKS/ARGUMENTS

Applicant responds herein to the Office Action dated March 12, 2003. A Petition for Extension of Time (one month) and the fee therefor are enclosed.

The applicant has opted to withdraw the method claims, without prejudice. Claims 9, 11, 12, 25 27 and 28 have been amended.

The application now contains claims 9-12 and 25-28.

The objections to claims 11-12 and 27-28, as set forth in paragraph 5 of the Office Action, are believed to have been obviated by the amendments to claims 11-12 and 27-28. Reconsideration and withdrawal of the objection is therefore requested.

Substantively, apparatus claims 9, 11, 25 and 27 stand rejected on grounds of anticipation by Matthews (5,464,480). Claims 10, 12, 26 and 28 are stated to be obvious in view of Matthews, in further view of Matsuo (6,403,498). Reconsideration of the rejections on art is requested in view of the amendments to the claims herein and the following remarks.

Preliminarily, it is noted that all of the method claims have been canceled from the application. Moreover, with respect to the apparatus claims, they have been rendered in "means-plus-function" format, wherein the recited function defines the structure by reference to the specification. It is believed that in that form, the function itself becomes part of the structure and the Examiner must give full consideration to the actual words of the claims which describe the function.

Particularly as amended herein, each of the claims generally covers a substrate treating apparatus which includes several distinctive structural elements.

A first one is a "support means" for supporting and spinning the substrate. A second one is a cleaning solution supply means having a nozzle for supplying a cleaning solution to the substrate, wherein the solution has ozone dissolved therein. Thirdly, an ultraviolet emitting means serves for emitting ultraviolet light to the substrate. Thus, during the cleaning process in which the cleaning solution is supplied from the cleaning solution supply means to the substrate supported and spun by the support means, the ultraviolet emitting means emits ultraviolet light to the cleaning solution supplied to the substrate and a puddle is formed on an upper surface of the substrate. The foregoing directly results from and defines the recited structure.

An apparatus and structure as described above provides the effect that oxygen radicals are easily generated by supplying the cleaning solution with the ozone dissolved therein to the substrate supported by the support means and also irradiating the cleaning solution with the ultraviolet light. Thereby, the oxygen radicals react with the water to generate OH radicals, thus increasing the activity of the cleaning solution.

A significantly improved cleaning capability is achieved even with low concentration ozone water. This is applicable also to a piecemeal or single-substrate treating apparatus for treating large substrates. Since the cleaning solution supplied to the substrate contains ozone in a low concentration, the filter and the piping material for supplying the cleaning solution do not need to have strong ozone resistance.

To reemphasize a point made above, since ultraviolet light is emitted to the cleaning solution that is already located on the substrate, OH radicals are generated adjacent the substrate surface to be cleaned. This assures an efficient cleaning operation.

In summary, the present invention relates to a single-substrate treating apparatus for treating a substrate while the substrate is supported and spun by the support means as set forth in the pending claims. None of the references disclose or suggest such an apparatus for treating substrates by using ozone. The invention is therefore respectfully submitted to be clearly patentable over the cited references, whether those references are taken individually or in combination.

Accordingly, the Examiner is respectfully requested to reconsider the application, allow the claims as amended and pass this case to issue.

I hereby certify that this correspondence is being deposited with the United States Postal Service with sufficient postage as First Class Mail in an envelope addressed to: Mail Stop AF, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450, on July 3, 2003:

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Name of applicant, assignee or
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Signature

July 3, 2003

Date of Signature

Respectfully submitted,

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